

THAT WHICH IS CLAIMED:

- 1 A method for altering amino acid composition of a native protein of interest
whose conformation is unavailable, said method comprising introducing amino acid
5 changes into said protein to create an engineered protein, said engineered protein having
the conformation of the native protein wherein said conformation of the engineered
protein is confirmed by binding with a set of antibodies that bind with the native protein.
2. The method of Claim 1, wherein said antibodies are monoclonal antibodies.
- 10 3. The method of Claim 2, wherein said amino acid changes are made to increase
levels of at least one essential amino acid in the engineered protein.
4. The method of Claim 3, wherein said essential amino acid is selected from the
15 group consisting of methionine, tryptophan, lysine, valine, phenylalanine, isoleucine,
leucine, threonine and cysteine.
5. The method of Claim 4, wherein said essential amino acid is methionine.
- 20 6. The method of Claim 1, wherein said amino acid changes are introduced into
predetermined sites.
7. The method of Claim 1, wherein said amino acid changes are introduced at
random.
- 25 8. A method for altering amino acid composition of a native protein of interest, said
method comprising introducing amino acid changes into said protein to increase
nutritional value to create an engineered protein, said engineered protein to create an
engineered protein, said engineered protein having the conformation of the native protein
30 wherein said conformation of the engineered protein is confirmed by binding with a set of
antibodies that bind with the native protein.

9. The method of Claim 8, wherein said antibodies are monoclonal antibodies.

10. The method of Claim 8, wherein said amino acid changes are made to increase
5 levels of at least one essential amino acid in the engineered protein.

11. The method of Claim 10, wherein said essential amino acid is selected from the
group consisting of methionine, tryptophan, lysine, valine, phenylalanine, isoleucine,
leucine, threonine and cysteine.

12. The method of Claim 8, wherein said amino acid changes are introduced into
predetermined sites.

13. The method of Claim 8, wherein said amino acid changes are introduced at
15 random.

14. The method of Claim 10, wherein said essential amino acid is increased to
represent 5% of the total amino acid content of the protein.

15. The method of Claim 10, wherein said essential amino acid is increased to
20 represent 10% of the total amino acid content of the protein.

16. The method of Claim 8, wherein said protein is vegetative storage protein.

17. An engineered protein having altered amino acid composition, wherein said
25 amino acid composition has been altered by introducing amino acid changes into said
protein, wherein said engineered protein binds to a set of antibodies capable of binding
with a corresponding native protein.

18. The protein of Claim 17 wherein said antibodies are monoclonal antibodies

19. The protein of Claim 17, wherein said amino acid changes increase the levels of at least one essential amino acid in the protein.

20. The protein of Claim 19, wherein said essential amino acid is selected from the group consisting of methionine, tryptophan, lysine, valine, phenylalanine, isoleucine, leucine, threonine and cysteine.

21. The protein of Claim 19, wherein said essential amino acid are increased to represent 5% of the total amino acid content of the protein.

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22. The protein of Claim 19, wherein said essential amino acid are increased to represent 10% of the total amino acid content of the protein.

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